

Tunnel Transitions Between Systems Which Are Described by Morse-Potential  
Curves

SOV/20-127-5-29/58

(Physics Institute imeni P. N. Lebedev of the Academy of  
Sciences, USSR)

PRESENTED: April 11, 1959 by V. N. Kondrat'yev, Academician

SUBMITTED: April 1, 1959

Card 3/3

"On Two-proton Radioactivity"

report submitted for the 2nd USSR Conference on Nuclear Reactions at Low and Intermediate Energies, Moscow, 21-28 July 1969.

GOLDANSKIY, V. I., KAGAN, Ye. M. (USSR)

"Thermo-Chemical effects of Ionizing Radiations".

paper submitted for the Symposium on the Chemical Effects of Nuclear Transformation  
(IAEA) Prague, 24-27 Oct. 1966.

S/120/60/000/03/004/055  
EO32/E514

24.6810

AUTHORS: Gol'danskiy, V.I., Karpukhin, O.A. and Pavlovskaya, V.V.

TITLE: Determination of the Energy Dependence of the Efficiency of Recording of High-Energy Gamma Rays

PERIODICAL: Priroda i tekhnika eksperimenta, 1960, No 3, pp 23-26

ABSTRACT: A new method is described for determining the energy dependence of the efficiency of recording of high-energy gamma rays (35-50 MeV) using a coincidence telescope. The method is based on measurements of Compton scattered gamma rays. The Compton cross-section is well-known and is given by the Klein-Nishina formula. At small angles the scattered gamma rays have a relatively large energy. Thus, for example, at a scattering angle of  $\theta = 3^\circ$  and incident gamma ray energy of 250 MeV, the energy of the scattered gamma ray is about 150 MeV. Thus by placing a gamma ray telescope at an angle of  $3^\circ$  to the beam axis, and by varying the maximum energy of the bremsstrahlung from a synchrotron, one can examine a wide energy range. The experiment was carried out in the gamma-beam of the

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EO32/E514

Determination of the Energy Dependence of the Efficiency of  
Recording of High-Energy Gamma Rays

265 MeV synchrotron at the Physics Institute, Ac.Sc., USSR. The experimental arrangement is shown in Fig 1. The gamma ray beam from the synchrotron target was collimated by a lead collimator, its maximum energy being set to 250, 200, 150, 115, 80 and 60 MeV. The gamma rays scattered at angles less than  $3^\circ$  were detected by the four-counter telescope shown in Fig 2. The efficiency of recording of gamma rays between 35 MeV and 150 MeV was measured as a function of energy, and the result obtained is shown in Fig 5. Acknowledgment is made to A.V.Kutsenko, A.Samiullin, S.P. Balat'yev and Ye. M. Petrov for help during the measurements.

There are 5 figures and 7 English references.

ASSOCIATION: Fizicheskiy institut AN SSSR (Physics Institute,  
Ac.Sc., USSR)

SUBMITTED: May 25, 1959  
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44

S/026/60/000/04/021/070  
D043/DC06

The Discovery of the Antiproton

mentioned. There are 6 photographs, 2 graphs and 2  
Soviet references.

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83202  
5/05/60/04/00/04/04  
8009/3070

24.6510

AUTHOR: Gol'danskiy, V. I.

TITLE: The Limits of Stability, the Proton- and Two-Proton Radioactivity of Neutron-deficient Isotopes of Light Nuclei

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki 1960, Vol. 39, No. 2(8), pp. 497 - 501

TEXT: By applying the principles of isotopic invariance to light nuclei, the author has been able to derive a very simple relationship between the binding energies of neutrons and protons in distant mirror nuclei.

$$\Delta E_{np} = E_n(N, Z, A) - E_p(Z, N, A) = [E_{\text{coul}}(Z, N, A) - E_{\text{coul}}(Z-1, N+1, A)] [E_{\text{coul}}(N, Z, A) - E_{\text{coul}}(N-1, Z+1, A)]$$

$\Delta E_{np}$  is the difference of the binding energies of the Zth neutron in the nucleus  $N, Z, A$  and that of the Zth proton in the mirror nucleus  $Z, N, A$ . The first two terms characterize the change in Coulomb energy when a proton is removed from the nucleus, the last two correspond to the

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The Limits of Stability, the Proton- and Two-  
Proton Radioactivity of Neutron-deficient  
Isotopes of Light Nuclei

S/056/60/049/002/049/044  
3006/3070

same change when a neutron is removed.  $\Delta E_{np}$  is independent of  $N$  to an accuracy of 1%, and may be approximately represented by the formula  
(2):  $\Delta E_{np} \approx 1.2(Z-1)(2Z-1)^{-1/2}$  Ultimately, a simple relation for the mass difference of distant mirror nuclei also follows from the isotopic invariance:

$$Z M_N^A - N M_Z^A \approx (Z-N) \Delta M_0; \Delta M_0 = A/2 + 1/2 M_{A/2-1/2}^A - A/2 + 1/2 M_{A/2+1/2}^A \text{ for odd } A.$$

and  $\Delta M_0 = \frac{1}{2} \{ A/2 + 1/2 M_{A/2-1}^A - A/2 - 1/2 M_{A/2+1}^A \}$  for even  $A$ . Formula (2) is very well confirmed by the available experimental material (See Table 1). With the help of the formula given here, the author determines the limit of stability with respect to decay with emission of protons of the neutron deficient isotopes of light nuclei, and predicts the properties of about 90 isotopes of this kind (See Table 2). He discusses the possibility of observing proton radioactivity and indicates some nuclei that may show it (for example,  $\text{Be}^6 \rightarrow \text{Li}^5 + p$ ). For two-proton radioactivity the following

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The Limits of Stability, the Proton- and Two- S/056/60/039/002/039/011  
Proton Radioactivity of Neutron-deficient B006/E070  
Isotopes of Light Nuclei

isotopes are indicated: Ne<sup>10</sup>, Mg<sup>17</sup>(18?), Si<sup>21</sup>(22?), S<sup>24</sup>(24?), Ar<sup>29</sup>(28?),  
Ca<sup>33</sup>(34?), Ti<sup>38</sup>, Cr<sup>42</sup>, Fe<sup>44</sup>(43?), Ni<sup>46</sup>(47?), Zn<sup>53</sup>(54?), Ga<sup>59</sup>(58?),  
Se<sup>63</sup>(62?), Kr<sup>67</sup>(66?). The main properties of two-proton radioactivity are  
discussed and the problems of probability are dealt with in detail. The  
problems of preparation of neutron-deficient light nuclei (bombarding of  
stable light nuclei with H or He<sup>3</sup> nuclei) are also discussed. The author  
thanks Ya. B. Zel'dovich for discussions. A. I. Baz' is mentioned. There  
are 2 tables and 5 references: 4 Soviet and 1 US.

ASSOCIATION: Fizicheskiy institut im. P. N. Lebedeva Akademii nauk SSSR  
(Institute of Physics imeni P. N. Lebedev of the Academy of  
Sciences of the USSR)

SUBMITTED: March 28, 1960

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87031

15.8106

S/190/60/002/007/015/017  
B020/B052

AUTHORS: Barkalov, I. M., Berlin, A. A., Gol'danskiy, V. I.,  
Dzantiyev, B. G.

TITLE: Radiation Polymerization of Phenyl Acetylene

PERIODICAL: Vysokomolekulyarnyye soyedineniya, 1960, Vol. 2, No. 7,  
pp. 1103-1107

TEXT: Purpose of this paper was the investigation of kinetics and the mechanism of the radiation polymerization of phenyl acetylene which was initiated by electrons with an energy of 1.5 Mev. The irradiation was carried out in special cuvettes (Fig. 1 a). The electron beam was introduced through a plane-parallel glass window 0.5 mm thick. For accurate thermostating within the range of positive temperatures, a different type of cuvette was used (Fig. 1, b). The temperatures of the polymerization were -196 to +85°C. The reaction yield was not higher than 10 - 12%, since in all experiments the initial stage of polymerization was investigated. The radiation dose was determined by a chemical dosimeter (0.02 mole/l of

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Radiation Polymerization of Phenyl  
AcetyleneS/190/60/002/007/015/017  
B020/E052

$\text{CuSO}_4$ , 0.002 mole/l of  $\text{FeSO}_4$ , and 0.02 n.  $\text{H}_2\text{SO}_4$  which was recommended by the Institut im. L. Ya. Karpova (Institute imeni L. Ya. Karpov). The developing  $\text{Fe}^{3+}$  was photometrically examined by a CF-4 (SF-4) spectrophotometer. The IR spectra of polyphenyl acetylene were studied by Yu. Sh. Moshkovskiy. The polyphenyl acetylene yield rises proportionally to the dose of wide ranges ( $10^7$  -  $10^8$  roentgen) (Fig. 2). Even with the largest doses applied, no noticeable destruction of the developed polymer was observed. This seems to prove the absence of effective inhibitor additions whose presence would be indicated by the S-shape of the curve. In the presence of atmospheric oxygen, the polymer yield is increased to the 1.5- to 2-fold under otherwise equal conditions. With a certain dose, the polymer yield does not depend on its quantity, not even at temperatures near the melting point or when the liquid monomer is exposed to radiation. The dependence of the polymer yield on the quantity of the dose was also investigated (Fig. 2) at 0 and  $-78^\circ\text{C}$ . The extremely low dependence of the polymerization rate of phenyl acetylene on the temperature is also typical. Experiments were carried out regarding the polymerization of phenyl acetylene in nonane and ethyl acetate. In these two solvents the

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Radiation Polymerization of Phenyl  
Acetylene

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polymer yield differed widely from that expected on the basis of the additivity law (Fig. 3). A very effective radiation energy transfer (the radiation is absorbed by the solvent molecules) to the phenyl acetylene molecules is observed. Substances with structures of the polyacetylene type have the same properties as aromatic hydrocarbons, namely that of taking up the energy of ionizing radiation. The laws of phenyl acetylene polymerization in many respects are specific, sometimes even the opposite of those of the usual radical polymerization. Summing up one may say that the polyphenyl acetylene yield is approximately 8 - 9 molecules when the radiation is 100 ev. In the liquid phase, polymerization and initiation rates are proportional. The activation energy is as low as approximately 700 kcal/mole. A mechanism was suggested which explains the unusual results by the specific properties of highly conjugated products during the polymerization of phenyl acetylene. In these products a strong delocalization of unpaired elements takes place, and the reactivity of similar molecules is reduced with an increase in their length. There are 3 figures and 6 references: 4 Soviet and 2 US.

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1. 2. 3. 4. 5. 6. 7. 8. 9. 10. 11. 12. 13. 14. 15. 16. 17. 18. 19. 20. 21. 22. 23. 24. 25. 26. 27. 28. 29. 30. 31. 32. 33. 34. 35. 36. 37. 38. 39. 40. 41. 42. 43. 44. 45. 46. 47. 48. 49. 50. 51. 52. 53. 54. 55. 56. 57. 58. 59. 60. 61. 62. 63. 64. 65. 66. 67. 68. 69. 70. 71. 72. 73. 74. 75. 76. 77. 78. 79. 80. 81. 82. 83. 84. 85. 86. 87. 88. 89. 90. 91. 92. 93. 94. 95. 96. 97. 98. 99. 100. 101. 102. 103. 104. 105. 106. 107. 108. 109. 110. 111. 112. 113. 114. 115. 116. 117. 118. 119. 120. 121. 122. 123. 124. 125. 126. 127. 128. 129. 130. 131. 132. 133. 134. 135. 136. 137. 138. 139. 140. 141. 142. 143. 144. 145. 146. 147. 148. 149. 150. 151. 152. 153. 154. 155. 156. 157. 158. 159. 160. 161. 162. 163. 164. 165. 166. 167. 168. 169. 170. 171. 172. 173. 174. 175. 176. 177. 178. 179. 180. 181. 182. 183. 184. 185. 186. 187. 188. 189. 190. 191. 192. 193. 194. 195. 196. 197. 198. 199. 200. 201. 202. 203. 204. 205. 206. 207. 208. 209. 210. 211. 212. 213. 214. 215. 216. 217. 218. 219. 220. 221. 222. 223. 224. 225. 226. 227. 228. 229. 230. 231. 232. 233. 234. 235. 236. 237. 238. 239. 240. 241. 242. 243. 244. 245. 246. 247. 248. 249. 250. 251. 252. 253. 254. 255. 256. 257. 258. 259. 260. 261. 262. 263. 264. 265. 266. 267. 268. 269. 270. 271. 272. 273. 274. 275. 276. 277. 278. 279. 280. 281. 282. 283. 284. 285. 286. 287. 288. 289. 290. 291. 292. 293. 294. 295. 296. 297. 298. 299. 300. 301. 302. 303. 304. 305. 306. 307. 308. 309. 310. 311. 312. 313. 314. 315. 316. 317. 318. 319. 320. 321. 322. 323. 324. 325. 326. 327. 328. 329. 330. 331. 332. 333. 334. 335. 336. 337. 338. 339. 340. 341. 342. 343. 344. 345. 346. 347. 348. 349. 350. 351. 352. 353. 354. 355. 356. 357. 358. 359. 360. 361. 362. 363. 364. 365. 366. 367. 368. 369. 370. 371. 372. 373. 374. 375. 376. 377. 378. 379. 380. 381. 382. 383. 384. 385. 386. 387. 388. 389. 390. 391. 392. 393. 394. 395. 396. 397. 398. 399. 400. 401. 402. 403. 404. 405. 406. 407. 408. 409. 410. 411. 412. 413. 414. 415. 416. 417. 418. 419. 420. 421. 422. 423. 424. 425. 426. 427. 428. 429. 430. 431. 432. 433. 434. 435. 436. 437. 438. 439. 440. 441. 442. 443. 444. 445. 446. 447. 448. 449. 450. 451. 452. 453. 454. 455. 456. 457. 458. 459. 460. 461. 462. 463. 464. 465. 466. 467. 468. 469. 470. 471. 472. 473. 474. 475. 476. 477. 478. 479. 480. 481. 482. 483. 484. 485. 486. 487. 488. 489. 490. 491. 492. 493. 494. 495. 496. 497. 498. 499. 500. 501. 502. 503. 504. 505. 506. 507. 508. 509. 510. 511. 512. 513. 514. 515. 516. 517. 518. 519. 520. 521. 522. 523. 524. 525. 526. 527. 528. 529. 530. 531. 532. 533. 534. 535. 536. 537. 538. 539. 540. 541. 542. 543. 544. 545. 546. 547. 548. 549. 550. 551. 552. 553. 554. 555. 556. 557. 558. 559. 560. 561. 562. 563. 564. 565. 566. 567. 568. 569. 570. 571. 572. 573. 574. 575. 576. 577. 578. 579. 580. 581. 582. 583. 584. 585. 586. 587. 588. 589. 590. 591. 592. 593. 594. 595. 596. 597. 598. 599. 600. 601. 602. 603. 604. 605. 606. 607. 608. 609. 610. 611. 612. 613. 614. 615. 616. 617. 618. 619. 620. 621. 622. 623. 624. 625. 626. 627. 628. 629. 630. 631. 632. 633. 634. 635. 636. 637. 638. 639. 640. 641. 642. 643. 644. 645. 646. 647. 648. 649. 650. 651. 652. 653. 654. 655. 656. 657. 658. 659. 660. 661. 662. 663. 664. 665. 666. 667. 668. 669. 670. 671. 672. 673. 674. 675. 676. 677. 678. 679. 680. 681. 682. 683. 684. 685. 686. 687. 688. 689. 690. 691. 692. 693. 694. 695. 696. 697. 698. 699. 700. 701. 702. 703. 704. 705. 706. 707. 708. 709. 710. 711. 712. 713. 714. 715. 716. 717. 718. 719. 720. 721. 722. 723. 724. 725. 726. 727. 728. 729. 730. 731. 732. 733. 734. 735. 736. 737. 738. 739. 740. 741. 742. 743. 744. 745. 746. 747. 748. 749. 750. 751. 752. 753. 754. 755. 756. 757. 758. 759. 760. 761. 762. 763. 764. 765. 766. 767. 768. 769. 770. 771. 772. 773. 774. 775. 776. 777. 778. 779. 780. 781. 782. 783. 784. 785. 786. 787. 788. 789. 790. 791. 792. 793. 794. 795. 796. 797. 798. 799. 800. 801. 802. 803. 804. 805. 806. 807. 808. 809. 810. 811. 812. 813. 814. 815. 816. 817. 818. 819. 820. 821. 822. 823. 824. 825. 826. 827. 828. 829. 830. 831. 832. 833. 834. 835. 836. 837. 838. 839. 840. 84

*(continued)*

1. The first step in the process is to identify the problem or issue that needs to be addressed. This involves gathering information and understanding the context of the problem.

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Con: 1.



Some Isotopes of Light Elements

S, J, 1/60, 072, 002, 002, 000  
B006, B067

with high neutron excess are dealt with. In this part, all properties of neutron binding energy in the nucleus are discussed (Fig. 6 shows  $E_n$  as a function of  $Z$  for a large number of  $N$ -values). All experimental results are presented and discussed. The possibilities of an experimental determination of the binucleon (reaction  $(n^2, \alpha) \rightarrow p$

$N^{14}$ ,  $n^2 \rightarrow B^{12}$ ,  $\alpha \rightarrow p$  MeV,  $n^2 \rightarrow \alpha$  decay on passage of  $n^2$  through matter and measurement of the neutron directional correlation (Fig. 7) are discussed. Furthermore experiments for determining  $B^8$  and  $He^8$  are discussed. In part 5 considerations are made on the stability limits and a five-page table containing a survey of various properties ( $N, A, (M-A), E_p, E_n, E_\beta, T_{1/2\beta}$ ) of isotopes with neutron excess as

well as of neutron-deficient elements for the region  $Z=2$  to  $Z=20$  is given which is highly valuable for practical work in this field.

B. E. Nemirovskiy and A. T. Varfolomeyev are mentioned. There are 6 figures, 1 table, and 20 references. 115 pages. 10 US and 1 Canadian

Can. J. Phys.

BAZ', A.I.; GOL'DANSKIY, V.I.; ZEL'DONICH, Ya.b.

Undiscovered isotopes of light nuclei. Usp. fiz. nauk 77  
no.2:211-234 0 '60. (MIRA 16:8)

(Isotopes)



GOL'DANSKIY, V. I., prof., doktor fiz.-matem.nauk; ZHDANOV, G.B., doktor  
fiz.-matem.nauk (g.Moskva)

Sample of scientific foresight. Fiz. v. shkole 20 no.3:5-11 My-Je  
'60. (MIRA 13:11)

(Particles (Nuclear physics))



53776

Hypothesis of the Neutral  $\rho^0$ -Meson Decay  
on Data on the Annihilation of Antiprotons

1. 10/10, 019/02/037/045  
B1.4/0.20

$\bar{p} \rightarrow \pi^0 + \pi^0$ ;  $\bar{p} \rightarrow \pi^0 + \pi^0$  Application of the equations developed in Refs. 1, 2 lead to the following results (Figs. 1-5). The decay mode (1) does not contradict the experimental data obtained with an arbitrary  $\rho^0$ -meson mass. Decay mode (2) requires a  $\rho^0$ -meson mass of  $> 3. \cdot m_{\pi^0}$  and decay mode (3) can be made to fit experimental data provided the  $\rho^0$ -meson mass is at least  $1.7 m_{\pi^0}$ . The emission of mesons with different signs in the annihilation of antiprotons thus excludes the existence of both  $\pi^0$ - and  $\pi^0$ -mesons. There are 3 figures and 16 references: 7 Soviet, 7 US, and 2 Italian.

ASSOCIATION: Fizicheskii Institut im. N. N. Lebedeva Akademii nauk SSSR  
(Institute of Physics imeni N. N. Lebedev of the Academy  
of Sciences USSR)

SUBMITTED April 26, 1967

Card 2/2

S/C56/50/C51/C05/C46/C51  
2006/2077

AUTHORS: I. I. Ildanskiy, V. I. Karpukhin, G. A. Ponomarev, G. V.

TITLE: Observation of the Positronium Reaction in Aqueous Solutions

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1960, Vol. 33, No. 5(11), pp. 1477 - 1478

TEXT: The present "Letter to the Editor" brings a contribution to the problem of the positron annihilation in aqueous solutions and the influence of different additions on these. The purpose of the tests whose results are compiled in a table was to prove that the different additions act mainly kinetically on the positronium annihilation in aqueous solutions and also to show a comparison of these effects with the oxidation-reduction characteristics and magnetic characteristics of different ions. The authors investigated the rate of  $\beta\gamma$ -annihilation of positrons from an  $\text{Na}^{22}$  source (0.1 mCi) in aqueous solutions. The table shows the data with respect to the  $\beta\gamma$ -annihilation rate compared to pure water under the

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Observation of the Positronium Reaction in Aqueous Solutions S/056/60/019/007/046/351  
2006/3077

influence of different additions (mainly different cations in the presence of positronium - inert  $\text{Cl}^-$  anions). A general tendency to a decrease of the  $C_{3\gamma}$  counting rate is found if stronger oxidizers are used but strong deviations can be found too. The deviations may frequently be caused through a  $^3\text{S}_1 \rightarrow ^1\text{S}_0$  conversion at unpaired electrons of paramagnetic ions, but there is no specific connection between the magnetic properties of the ions and the quantity  $C_{3\gamma}$ . A strong decrease of the  $C_{3\gamma}$  counting rate was found also by other authors, if  $\text{NO}_3^-$  ions were added and also that  $\text{MnO}_4^-$  ions acted stronger yet. The following data characterize the concentration dependence of  $C_{3\gamma}$  for  $\text{MnO}_4^-$  additions as compared to neutral solutions:

Observation of the Positronium Reaction in  
Aqueous Solutions

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3006/2007

| Concentration<br>MnO <sub>2</sub> in mole/l | saturated<br>solution | 0.1             | 0.01            | 0.001           | 0 (water)       |
|---|-----------------------|-----------------|-----------------|-----------------|-----------------|
| $C_{37} \text{ min}^{-1}$                   | $3.6 \pm 0.42$        | $5.08 \pm 0.45$ | $5.08 \pm 0.12$ | $5.50 \pm 0.30$ | $6.04 \pm 0.09$ |

The authors thank Academician A. N. Frumkin for discussions of the re-  
sults obtained. There are 1 table and 4 non-Soviet references.

ASSOCIATION: Fizicheskiy institut im. P. N. Lebelova Akademii nauk SSSR  
(Physics Institute imeni P. N. Lebelov of the Academy of  
Sciences USSR). Institut khimicheskoy fiziki Akademii  
nauk SSSR (Institute of Chemical Physics of the Academy of  
Sciences USSR)

SUBMITTED: August 2, 1960

83608

S/056/60/038/C05/041/050  
B006/B063

24.6700

AUTHOR: Gol'danskiy, V. I.TITLE: Superheavy Isotopes<sup>19</sup> of Hydrogen and HeliumPERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki: 1960.  
Vol. 38, No. 5, pp. 1637 - 1639

TEXT: Data on the neutron pairing energy may be used to estimate the stability of numerous isotopes (especially  $H^5$ ,  $H^7$ , and  $He^8$ ) against neutron emission. The present "Letter to the Editor" shows that this method offers usable results for the above-mentioned isotopes. Fig. 1 shows the pairing energy  $E_p$  as a function of  $Z$  of the first six neutron shells (from  $1s_{1/2}$  to  $2s_{1/2}$ ) for all elements from hydrogen to potassium.

( $E_p$  denotes the difference between the binding energies of the  $(2m+2)$ nd and  $(2m+1)$ st neutron). It may be seen that nuclei with odd proton numbers have a smaller  $E_p$  than those with even proton numbers.  $He^8$ : The pairing energy is not higher than 2.86 Mev and not lower than 1.54 Mev (the values for  $He^6$  and  $Li^9$ , respectively). Thus, the requirement that

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Superheavy Isotopes of Hydrogen and Helium S/056/60/018/005/041/050  
B006/B063

the  $\text{He}^7 \rightarrow \text{He}^6 + n$  decay energy be smaller than  $\sim 1.4$  Mev is a necessary condition, and that this energy be not higher than  $\sim 0.8$  Mev is a sufficient condition for the stability of  $\text{He}^8$ . A comparison between the masses of  $\text{Li}^7$ ,  $\text{He}^6$ , and  $n$  along with the correction for Coulomb interaction indicates that  $\text{He}^8$  is stable if the first level ( $T = 3/2$ ) for  $A=7$  is not higher than 12.7 Mev, and that it is safely stable if this level is below 12 Mev. If the level with  $T = 3/2$  exists, the  $\text{He}^7 \rightarrow \text{He}^6 + n$  decay has an energy of about 1.1 Mev, and from the condition of stability it follows that the pairing energy of the two last neutrons is not lower than  $\sim 2.2$  Mev. The problem of the stability of  $\text{He}^8$  remains unsolved. Some experiments which might contribute to its explanation are given.  $\text{H}^5$ : Also in this case  $E_p \sim 2.86$  Mev (this is the value for  $\text{He}^6$  which is the even nucleus with the same number of neutrons). Furthermore,  $\text{H}^5$  can be only stable if the energy of the  $\text{H}^4 \rightarrow \text{H}^3 + n$  decay is not higher than  $\sim 1.4$  Mev. A comparison between the masses of  $\text{He}^4$ ,  $\text{H}^3$

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Superheavy Isotopes of Hydrogen and Helium S/056/60/038/005/04\*/050  
B006/B063

and  $n$  along with the correction for Coulomb interaction shows that  $H^5$  can be only stable if the level with  $T=1$  for  $\alpha$ -particles is below  $\sim 22$  Mev. The fact that no  $He^4$  levels are known for this range indicates that  $H^5$  is unstable. The upper limit of the level with  $T=1$  is calculated to be  $\sim 25.2$  Mev. The stability against the  $H^5 \rightarrow H^3 + 2n$  decay depends on the energy of the level with  $T = 3/2$  for  $A=5$ , which is  $\lesssim 19.4$  Mev. All data indicate that this nucleus is unstable. If the  $H^7$  nucleus were stable, it would be found in reactions of the mode  $Be^9(\pi^-, 2p)$  in photoemulsions. Ya. B. Zel'dovich and A. A. Ogloblin are thanked for discussions. There are 2 figures and 6 references: 2 Soviet, 3 US, and 1 Dutch.

ASSOCIATION: Fizicheskiy institut im. P. N. Lebedeva Akademii nauk SSSR  
(Institute of Physics imeni P. N. Lebedev of the Academy  
of Sciences USSR)

SUBMITTED: January 16, 1960

Card 3/3

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S/O 6/60, O/B/CO, C/12, C/11, XX  
PCO6/BOVO

24.6900 (1138, 1191, 1559)

AUTHORS: Gol'danskii V. I. Karpukhin O. A. Katsenka A. V.  
Pavlovskaya V. V.

TITLE: Elastic  $\gamma p$  Scattering at Energies of 40-70 Mev and  
the Polarizability of the Proton

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki.  
1960, Vol. 38, No. 6, pp. 1694-1700

TEXT: The present paper gives a detailed description of the results of scattering experiments, of the determination of the differential elastic  $\gamma p$  scattering cross sections, and of a comparison of the results with theory. The object of the experiments was to obtain more exact data giving a definite information on the polarizability of the proton. The experiments were carried out on the 260-Mev synchrotron of PIAN in the gamma energy range of 40-70 Mev (maximum bremsstrahlung energy 75 Mev) and at essentially lower than the  $\pi^0$  production threshold. The experimental arrangement is schematically shown in Fig. 1. The

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p. 675

Elastic  $\gamma\gamma$  Scattering at Energies of 40 - 70 Mev and the Polarizability of the Proton

2001-6-6, 018/001/018/018/XX  
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target was a cylindrical vessel (4 cm diam) filled with liquid hydrogen. Two telescopes consisting of four scintillation counters with a lead converter behind the first and an aluminum filter in front of the last served as high-threshold (10-15 Mev) gamma detectors. Each counter was connected with an  $\text{Si-100}$  (FET)  $\text{Si-100}$ . The block diagram of the electronic apparatus is shown in Fig. 1. A thin-walled ionization chamber placed in front of the first collimator served as an intermediate monitor. The duration of the electron pulses of the synchrotron was up to 2000  $\mu\text{sec}$ . The detecting telescopes were placed at angles of 45, 75, 90, 120, 135 and 180 with respect to the bremsstrahlung beam. The experimental conditions and the apparatus are thoroughly described in the paper. One section is devoted to the description of the telescope efficiency and one to the evaluation of the experimental results. A table gives the measured values of  $d\sigma/d\Omega$  the necessary corrections and the final values. The introduction of the corrections for the background and for the size of the target and the determination of the systematic error are discussed in the text.

Card 2/3

B5676

Elastic  $\gamma$  Scattering at  $20^\circ$  and  $40^\circ$   
 40 - 70 Mev and the Polarizability  
 of the Proton

U. S. G. 40, 018, 006 G-8, 103, XX  
 B008, B070

The data obtained are compared with the theoretical results which were obtained by taking into account the anomalous magnetic moment of the proton and the effects of resonances of  $\Delta$  polarization (see Fig. 1). From  $d\sigma/d\Omega(90^\circ) = (1.1 \pm 0.05) \times 10^{-28} \text{ cm}^2$  at  $20^\circ$  and  $40^\circ$  the proton polarizability (electric) was found to be  $\alpha_E = (9.2 \pm 0.7) \times 10^{-27} \text{ cm}^3$ . If dispersion

relations are used in addition to the experimental results, it is possible to calculate, from the pion photoproduction data, the sum of electric and magnetic polarizabilities  $\alpha_E + \alpha_M = 0.44 \times 10^{-27} \text{ cm}^3$  (Fig. 2). Then, taking into account also the errors, one finds

$\alpha_E = (9.2 \pm 0.7) \times 10^{-27} \text{ cm}^3$  and  $\alpha_M = (2.2 \pm 0.7) \times 10^{-27} \text{ cm}^3$ . The results are finally

discussed and compared with results of other authors. In particular, the results of neutron polarizability obtained by various authors are discussed and intercompared. From the value  $\alpha_E = 9.2 \times 10^{-27} \text{ cm}^3$  obtained for protons the root mean square fluctuation of the proton electric dipole length is found to be  $(r^2)^{1/2} = 0.15 \text{ fm}$ .

Card 3/4

34. 10

Elastic  $\gamma\gamma$  Scattering at Energies of  
40 - 70 Mev and the Polarizability  
of the Proton

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1000,000

S. P. Belashov, R. V. Yul'kin, Yu. V. Zhurav, and A. Zhurav  
thanked for assistance. I. V. Zhurav for help in the calculation of  
ments; and A. M. Balashov and V. N. Zhurav for help in the calculation of  
Aleksandrov and V. A. P. Zhurav's are mentioned. The authors are grateful  
table and to reference. G. Soviet 100,000,000,000 1010,000

ASSOCIATION: Fizicheskii Institut im. P. N. Lebedeva Akademii Nauk SSSR  
Institute of Physics im. P. N. Lebedev of the Academy  
of Sciences USSR,

SUBMITTED: January 1, 1960

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2/10/00/00/007/009  
101/1000

AUTHORS: Barkalov, I. M., Gaidanovskiy, V. I., Dementiyev, B. G.,  
Yegorov, Ye. V.

TITLE: The Welding of Teflon and Other Polymeric Materials by the  
Localized Action of Neutron Radiation

PERIODICAL: Vysokomolekulyarnyye Soedineniya, 1980, Vol. 1, No. 1,  
pp. 110-1104

TEXT: A simple process was developed for local welding of Teflon and other polymeric materials by irradiating the materials to be welded with thermal neutrons after pretreatment of the material surface with boron- and lithium compounds. The following polymeric materials were welded: Teflon - polystyrene, Teflon - polymethyl methacrylate, polystyrene - polymethyl methacrylate, polyethylene - polystyrene, polyethylene - polymethyl methacrylate. Prior to irradiation, the surfaces to be welded were treated with solutions of boron- and lithium compounds and subsequently exposed to a thermal neutron flux from the PBT-1000 (IRT-1000) reactor. The tear resistance of the Teflon - polystyrene weld is a function of the mega-

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06322

The Welding of Teflon and Other Polymeric  
Materials by the Localized Action of Neutron  
Radiation

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EO12/EO55

roentgen dose applied to the surface. At constant  $B_2O_3$  concentration, was investigated and the results are shown in a figure. The tear resistance of the Teflon - polystyrene weld is 10 kg/cm. The mechanism involved in welding polymeric materials by localized neutron irradiation is discussed. The thermal effect is assumed to be the main factor in this type of welding. Triple layer - films of polyethylene and Teflon and other polymeric and non-polymeric materials can be effected by applying interleaves of lithium- and boron-containing polystyrene films. There are 1 figure and 7 references: Soviet and US.

ASSOCIATION: Institute Khimicheskoy Fiziki AN SSSR (Institute of *Chemical* Physics)  
*Chernobyl* of the Academy of Sciences USSR

SUBMITTED: May 17, 1990

1. The first step is to identify the problem or question that needs to be addressed. This involves understanding the context and the specific requirements of the task.

[illegible]



## Radiation-Induced Polymerization of Monomers in the Solid State

I. M. Buranov, V. I. Gol'dfarb, N. S. Litvinenko,  
S. F. Terletskiy and G. I. Trubnikov

The first investigation of the kinetics of the radiation-induced polymerization of a number of vinyl monomers has been made, thus far, by several workers.<sup>1-4</sup> The polymerization of styrene in a 0.1 M NaCl solution, for the purpose of time studies, has been reported to be inhibited by the addition of 10<sup>-3</sup> M of a number of substances.<sup>5</sup> The polymerization of styrene in a 0.1 M NaCl solution, for the purpose of time studies, has been reported to be inhibited by the addition of 10<sup>-3</sup> M of a number of substances.<sup>5</sup> The polymerization of styrene in a 0.1 M NaCl solution, for the purpose of time studies, has been reported to be inhibited by the addition of 10<sup>-3</sup> M of a number of substances.<sup>5</sup>

For a more complete discussion of the history of the concept of the "state of mind" see the following references:

report presented at the 2nd Intl. Congress of Fertilization Research,  
Harrogate/Yorkshire, Gt. Brit. 5-11 Aug 1962

### Some Peculiarities of the Russian Language

V. I. Gol'dshteyn, I. M. Prikshin and S. S. Kuz'minov

[illegible]

$\therefore$  we have  $P_{A_1} = P_{A_2} = \dots = P_{A_n}$ , i.e.,  $A_1, A_2, \dots, A_n$  are independent.

report presented at the 2nd Intl. Congress of Radiation Research,  
Harrogate/Yorkshire, Gt. Brit. 5-11 Aug 1962

22291  
S 353/-1/073,001001007  
3125 B3C1

24.6200

AUTHORS: Goldanskii, V. I., Peker, L. K.

TITLE: Some problems of the isomerism of atomic nuclei

PERIODICAL: Uspekhi fizicheskikh nauk, v. 73, no. 4, 1961, 611-633

TEXT: The authors wanted to complete the following synoptic articles by the detailed discussion of some special problems of nuclear isomerism: M. I. Korusunskiy "Isomerism of atomic nuclei" (1954), a survey by L. I. Rusinov and G. M. Drabkin in the January 1959 issue of Uspekhi fizicheskikh nauk; an article by L. I. Rusinov (deceased), Uspekhi fizicheskikh nauk, v. 73, no. 4, 1961, 615-630 on the story of the discovery of the isomerism of atomic nuclei and on the outstanding contribution by I. V. Kurchatov to the study of this phenomenon. The first part of the present paper deals with isomeric transitions near the millisecond range ( $10^{-5}$  - 1 sec). Until late in 1955, no more than 10 isomeric transitions were known in this range. According to O. I. Leppunskiy, this lack was due to insufficient research work in the field of the excitation of

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E125, E201

Some problems of the isomerism of...

such levels by strong pulsed accelerators. According to formula by Weisskopf and S. A. Moskhovskiy for single-particle transitions, such with  $T_{1/2} = 10^{-5}$  to 1 sec and with an energy between 100 and 500 keV must be predominantly octupole transitions (of the type  $E3$  and  $M3$ ) or magnetic quadrupole transitions (of the type  $M2$ ). One of the main achievements attained with the single-particle shell model was the explanation of "isomerism islets". According to the generalized shell model, isomeric transitions of an arbitrary type are possible in deformed nuclei. The single-particle shell model is only an approximation model and cannot precisely describe the energy of single-particle levels. O. I. Leppan'skiy, A. M. Morozov, Ya. V. Makarov, P. A. Yampol'skiy (JETP 31, 127 (1957)) discovered in the Tl arising from the irradiation of Hg by fast protons two shortlived activities with  $T_{1/2} = 0.042$  sec ( $E_\gamma = 170$  keV) and  $T_{1/2} = 5 \cdot 10^{-3}$  sec. Because of the great variety of the material concerned, only a few conclusions can be indicated in the abstract for a summary: When allowing for the regrouping of single-particle levels in the 35proton-Mayer scheme, it will be practically possible to explain all "anomalous" isomeric states

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Some problems of the isomerism of...

and transitions of the types  $E3$  and  $M2$ , by taking account of the configuration levels. The levels with the spins  $I_0 + 1$  and  $I_0 + 2$  are most probably collective levels forming a rotational band related to the  $\gamma$  band state. There are already many signs pointing to the necessity of undertaking a simultaneous study of the collective and the single-particle properties of nuclear levels. Isomeric states in odd-odd nuclei: (1) General characteristic properties: levels with small and large spin values (corresponding to addition or subtraction of  $j_p$  and  $j_n$ ) are found more frequently with

odd-odd nuclei than with odd nuclei. It is therefore most probable that one or several levels with widely varying spin values appear near the ground state. Even though the multiplet configuration may be known (values of  $j_p$  and  $j_n$ ), the spin of the isomeric and also of the ground

state of an odd-odd nucleus is still difficult to be explained. Fig. 7 shows the intervals  $\Delta E$  (keV) between the single-particle levels  $7+2-(i_{13/2}-f_{5/2})$  in odd-odd nuclei of  $_{81}\text{Ti}$  and in odd nuclei of  $_{80}\text{Hg}$  and  $_{82}\text{Pb}$  as a function of the number of neutrons.  $\bullet$  - filled circles. Excited levels are also interpreted in deformed odd-odd nuclei. In fact, there

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Some problems of the isomerism of...

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 2123 2201

can be only one odd nucleon on a level with  $\Omega_p \wedge \Omega_n \neq \Sigma$ , and the total angular momentum of the odd pair of nucleons is equal to the angular momentum  $\Omega_p(n)$  of  $n$  is nucleon. In the presence of a deformation the multiplet is always reduced to a doublet, whose elements have the spins  $I = K = |\Omega_p \pm \Omega_n|$ . Palnikar and M. Shakhmurov have suggested the following semiempirical rule: The level with  $K = |\Omega_p + \Omega_n|$  is the lower level of the abovementioned doublet if the projections of the spin moments  $\Sigma_p$  and  $\Sigma_n$  are equal. In the opposite case, the level with  $K = |\Omega_p - \Omega_n|$  is the lower ground state. Most of the experimental data confirm this rule. From the configuration levels and the possibilities of their transitions by multichannel ions. The rule shows the possible values of the spin moments for the configuration levels. In the transitions between the configuration levels it is necessary that an E2 or M1 radiation be emitted (or also conversion electrons). The cross sections of the excitation of configuration levels by multichannel ions are finally increased. The configuration levels may appear with inelastic scattering, e...;

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Some problems of the isomerism of...

$^{18}\text{Ar}^{40}(0) + ^{36}\text{Kr}^{83}(9/2+) \rightarrow ^{18}\text{Ar}^{40*}(6+) + ^{36}\text{Kr}^{83*}(21/2+)$ , and sometimes also in neutron transfer processes of the type

$^{36}\text{Kr}^{83}(9/2+) + ^{30}\text{Sr}^{87}(9/2+) \rightarrow ^{36}\text{Kr}^{84*}(8+) + ^{30}\text{Sr}^{86*}(8+)$ . The exponential function of neutron exchange has been calculated similarly to Ye. M. Lifshits. The excitation cross section of a nucleus with  $N$  neutrons and  $Z$  protons reads

$$\sigma_{\text{ex}}(N, Z) \approx \sigma_{\text{open}}(N-1, Z) \exp \left\{ -2(R - \rho) \chi(N, Z) - \right. \\ \left. - 2R \frac{I(N, Z) - I^*(N, Z)}{E_0} \operatorname{arctg} \frac{I(N, Z) - I^*(N, Z)}{E_0 [\chi(N, Z) + \chi^*(N, Z)]} + \right. \\ \left. + 2R \frac{I(N-1, Z) - I(N, Z)}{E_0} \operatorname{arctg} \frac{I(N-1, Z) - I(N, Z)}{E_0 [\chi(N-1, Z) - \chi(N, Z)]} \right\} \quad (5)$$

The dissertation of candidate A. K. Morozov (Institut khimicheskoy fiziki AN SSSR - Moskovskiy inzhenerno-fizicheskiy institut, 1961. g.) (Institute of Chemical Physics of the AS USSR - Moscow Institute of Physics and

Card 5/8

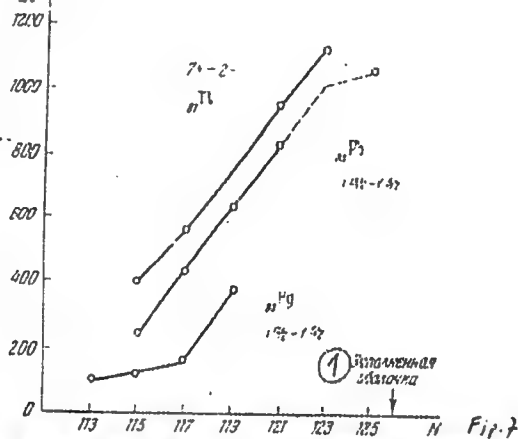
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Some problems of the isomerism of...

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B125/3201

Engineering, 1961) contains a complete list of the elements bombarded by 10.2-Mev protons. There are 7 figures, 1 table, and 52 references: 23 Soviet-bloc and 29 non-Soviet-bloc. The two most recent references to English-language publications read as follows: A. Zucker, Phys. Rev. Lett. 4, 21, 1960; J. Pinajian, Nucl. Phys. 17, 44 (1960).

Legend to Fig. 7:  
1, filled shell.



Card 6/84



GOLDBERG, V. prof.

"Three little strange world" by I. Danin. Izvestiya V. I. Danin.  
Tel Aviv. 19 no. 10.34 191. (Danin. b )  
(Lazav. Philosophy)

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S/O 10/61/000/01 1001 00

AUTHOR Gol'danskiy, V. I. Professor

TITLE Nuclear chemistry and its prospects

PERIODICAL Akademiya nauk SSSR Vestnik, no. 11, 1961, pp. 34

TEXT: The prospects of the new nuclear chemistry are referred to the main problems. (1) investigation of properties and conversions of atomic nuclei, requiring the application of chemical methods; (2) use of methods and conceptions from nuclear physics and physics of elementary particles for the investigation of chemical properties and conversions. Main problems of nuclear chemistry are: (1) Investigation of multichannel nuclear reactions, and problems of cosmochemistry and geochemistry connected therewith. Similar investigations were conducted in the USSR by A. P. Vinogradov, A. K. Lavrukhina, Institut geokhimi i analiticheskoy khimii im. V. I. Vernadskogo (Institute of Geochemistry and Analytical Chemistry imeni V. I. Vernadskiy), A. V. Kurchatov, Institut atomnoy energii im. I. V. Kurchatova (Institute of Atomic Energy imeni I. V. Kurchatov), A. N. Murin, Radiyevyy institut im. V. G. Khlopin (Radio Institute

Card 1

## Nuclear chemistry and its prospects

by V. G. Khlopov and V. N. Mezentsev

men. V. G. Khlopov), and V. N. Mezentsev. "Nuclear Chemistry and its Prospects" (Izvestiya Akademii Nauk SSSR, Khimicheskaya Fizika, 1978, No. 1, p. 1).  
Radium Institute (men. V. G. Khlopov) developed a method of thick and  
emulsions for investigating high-energy nuclear reactions. The process  
of secondary neutrons in processes of separation and absorption in  
investigated by the author at the Institut Khimicheskoy Fiziki, Akademiya  
Nauk SSSR (Institute of Chemical Physics of the Academy of Sciences, USSR).  
(1) Search for new isotopes, new elements, new types of radiation. In  
recent years the formation of neutron deficient isotopes and rare earths  
has been investigated in the USSR by V. S. Dotsenko and A. A. Mironov. In  
1940, spontaneous fission was discovered in the USSR by V. S. Dotsenko and  
K. A. Petrzhak. (2) Nonconservation of parity and symmetry. On  
conservation of the preservation of parity and symmetry. On  
physics of L. P. Landau. (3) New atoms and molecules. On  
activation and utilization in chemistry. On the properties of  
properties, and on the structure of molecules. On the properties of  
effect and the structure of molecules. On the properties of  
transformation in chemistry. On the properties of molecules and atoms.  
was carried out at the Institute of Chemical Physics, Academy of Sciences, USSR.

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Nuclear Chemistry and its Applications

Institute of Chemical Physics, Academy of Sciences of the U.S.S.R., Moscow, U.S.S.R.  
and Nuclear Chemistry of the Institute of Chemical Physics, Academy of Sciences of the U.S.S.R.

S/020/62/147/001/010/022  
B101/E134

AUTHORS: Gol'danskiy, V. I., Corresponding Member AS USSR, Gorodinskiy, I. M., Karyagin, S. V., Korytko, L. A., Krizhanskiy, L. M., Mikarov, Ye. F., Sazhinov, I. P., Khrapov, V. V.

TITLE: Investigation into the Mossbauer effect in tin compounds

PERIODICAL: Akademiya nauk SSSR. Doklady, v. 147, no. 1, 1962, 127 - 130

TEXT: The Mossbauer effect in the symmetrical compounds  $\text{SnCl}_4$ ,  $\text{SnBr}_4$ ,  $\text{SnI}_4$ ,  $\text{Sn}(\text{C}_6\text{H}_5)_4$  and  $\text{SnO}_2$  and in the asymmetrical compounds  $\text{Ph}_2\text{SnHal}$  ( $\text{Ph} = \text{C}_6\text{H}_5$ ,  $\text{Hal} = \text{F}, \text{Cl}, \text{Br}, \text{I}$ ) was studied using an apparatus in which the absorber moved uniformly with respect to the source and an apparatus with sinusoidal movement.  $\beta\text{-Sn}$  or  $\text{SnO}_2$  were used as sources of the 24.8-kev gamma-quanta ( $\text{Sn}^{119\text{m}}$ ). With the symmetrical compounds the chemical shift  $\delta$  of the absorber lines with respect to  $\beta\text{-Sn}$ , expressed in mm/sec ( $1\text{mm/sec} = 7.2 \cdot 10^{-8} \text{ ev}$ ), was a linear function of the electronegativity of the atoms bound to Sn. The equation  $\delta = 1.6 \cdot 10^{-2} \sum \chi_{\text{absorb}}^2 - \chi_{\text{emit}}^2$  AR/Rev  
Card 1/34

1/020/62/147/001/018/022  
H101/B144

Investigation into the...

given by A. J. P. Boyle, D. J. P. Sanbury, G. Elwars (Proc. Phys. Soc., 70, 416(1962)) and the data on the ionicity of the Sn-dal bonds, obtained by the method of A. L. Semakow (U. Chem. Phys., 22, 1811 (1950)) and those of M.M. Yakshin et al. (Zhukha, 3, 311(1961)) on refraction and dielectric constant give  $\delta_{ion} = -(5.1 \pm 0.3) \text{ mm/sec} = -(4.4 \pm 0.4) \cdot 10^{-7} \text{ ev}$ ,

$R/R(\text{Sn}^{119}) = +(1.2 \pm 0.2) \cdot 10^{-6}$  for a completely ionized bond. These data enable  $\langle \mu_{5s}(0) \rangle^2$  to be determined directly from 6. In the asymmetrical

compounds, asymmetrical doublets were observed (Fig. 2) similar to those found by Boyle et al. in  $\text{SnF}_4$ . The asymmetry was found also in dissolved compounds and cannot be explained by a random orientation of the crystals in the direction of the gamma quanta or by ferromagnetic or paramagnetic impurities. From the equation

$$\frac{\sigma_{11}^{\text{total}}}{\sigma_{11}^{\text{mean}}} = \frac{\int_{-1}^{+1} [2 \sqrt{5} P_0(\cos \theta) - P_2(\cos \theta)] f(\cos \theta) d \cos \theta}{\int_{-1}^{+1} [2 \sqrt{5} P_0(\cos \theta) - P_2(\cos \theta)] f(\cos \theta) d \cos \theta} \quad (3)$$

where the subscript "total" = total,  $\overline{P}_L(\cos \theta)$  is the normalized Legendre

Investigation into the...

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 B101/B144

polynomial,  $f(\cos\theta) = \frac{1}{2} a_2 \bar{P}_2(\cos\theta)$  is the factor determining the intensity of the Mossbauer line,  $a_2$  the decay coefficient, it follows that if  $\frac{J_{13, tot}/J_{11, tot}}{2\sqrt{5}} = (2\sqrt{5}a_0 + a_2)/(2\sqrt{5}a_0 - a_2) \neq 1$  (with  $a_2 \neq 0$ ) and  $-2\sqrt{5} a_2/a_0 < 2.0$ , each of the peaks of the Mossbauer doublet may become higher than the other one according to the ratio  $a_0/a_2$ . This ratio can be determined experimentally. Assuming a quadrupole splitting of the Mossbauer line in  $\text{SnF}_4$  and  $\text{Ph}_3\text{SnHal}$ ,  $q = 0.9 \cdot 10^{18} \text{ x v/cm}^2$  is obtained where  $q = \partial^2 v / \partial x^2$  is the gradient of the electric field in the region of the  $\text{Sn}^{119}$  nucleus, and  $x$  is the degree of ionization of the bond. For  $\text{Ph}_3\text{SnHal}$   $x = 0.55$  with  $\text{Hal} = \text{I}$ ;  $x = 0.7$  with  $\text{Hal} = \text{Br}, \text{Cl}$  and  $x = 1$  with  $\text{Hal} = \text{F}$ . Another possible interpretation of the asymmetrical splitting might be the different hybridization of the  $\text{sp}^2\text{d}^2$  bonds. In order to explain this problem it is suggested that the effective charges of the halogen and tin atoms be determined directly. When an equimolecular mixture of  $\text{SnPh}_4$  and  $\text{SnI}_4$  was irradiated with 1.0-Mev electrons the Mossbauer spectrum was

Card 3/5

Investigation into the...

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B101/B144

observed to be greatly changed through the spectra of various disproportionation products  $\text{Ph}_2\text{SnI}_{2-n}$  being superimposed. Hence it is concluded that the Moskauer effect can be used not only to study the chemical structure but also to solve problems of chemical kinetics and radiation chemistry. There are 2 figures.

ASSOCIATION: Institut khimicheskoy fiziki Akademii nauk SSSR (Institute of Chemical Physics of the Academy of Sciences USSR)

SUBMITTED: July 21, 1962



SEMEKOV, N. N., akademik (Moskva); YENIKOLOPYAN, N. S. (Moskva);  
GOLDMANSKIY, V. I. (Moskva)

On the problem of polymerization at low temperatures.  
Rev chimie 7 no. 1: 501-511 '62.

1. Institut khimicheskoy fiziki AN SSSR, Moskva.

3/023/02/000/000/006/007  
3125/3102

AUTHORS: Gell'manskiy, V. I., Maksimenko, V. M.

TITLE: Annihilation of antiprotons stopped in hydrogen and the hypothesis regarding the neutral  $\eta^0$ -meson

SOURCE: Nekotoryye voprosy fiziki elementarnykh chastits i atomnykh yadra. Ed. by V. D. Skkhaylov and I. L. Rozental'. Mosk. inzh.-fiz. inst. Moscow, Gosatomizdat, 1962, 118-130

TEXT: Gell-Mann's and Nishijima's original and modified classifications of elementary particles predicted the existence of a  $\eta^0$ -meson with zero isotopic spin and zero strangeness. According to Ya. B. Zel'dovich (ZhETF, 34, 1644, 1956), this meson is pseudoscalar and spinless, and in any case its mass is greater than that of the neutral pion. When  $m_{\eta^0} < 2m_{\pi}$ , the main decay mode is  $\eta^0 \rightarrow 2\gamma$ , and when  $2m_{\pi} < m_{\eta^0} < 3m_{\pi}$ , the mode  $\eta^0 \rightarrow \pi^+ + \pi^- + \gamma$  is also possible. The  $\eta^0$ -meson discovered by A. H. Balcin (Nuovo Cimento, 3, 569 (1956)) is regarded as a concrete version of the hypothetical

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 B125, B102

Annihilation of antiprotons stopped...

$\omega$ -meson.  $\omega$ , and especially  $\omega_0$ , may be produced by a strong interaction:  $p + \bar{p} \rightarrow \omega + \text{He}^4$ . The vector spin-1  $\omega$ -meson (vector) must decay according to  $\omega \rightarrow \pi^+ \pi^- \pi^0$  ( $\tau \sim 10^{-10}$  sec) when  $m_\omega < 4m_\pi$ , and according to  $\omega \rightarrow \pi^+ \pi^- \pi^0 \pi^0$  when  $m_\omega > 4m_\pi$  ( $\tau \sim 10^{-10}$  sec). The data available on the annihilation of antiprotons stopped in hydrogen are incompatible with the existence of  $\omega$ -mesons with  $m_\omega < 1.5 m_\pi$  and  $m_\omega > 1.5 m_\pi$ . All attempts to discover the  $\omega$ -meson experimentally failed; for example, no capture of stopped pions by protons could be observed, and the search for the reaction  $p + \bar{p} \rightarrow \omega + \text{He}^4$  and for the heavy  $\omega$ -meson failed. An analysis of the possible  $\omega$  decays when antiprotons are stopped in hydrogen, based on the statistical theory of multiple processes, pointed to the impossibility of  $\omega$  existing with  $m_\omega < 1.5 m_\pi$  or  $m_\omega > 1.5 m_\pi$ . The possibility of using the

distribution of effective mass  $(M = \sqrt{s^2 - p^2})$  in the search for  $\omega$

Card 2/3

Annihilation of antiprotons stopped...

5/523/62/C.O./000/006/007  
5125/B102

(Golmitz, A. et al. Annual Intern. Conf. on High Energy Physics at  
Bonn, 1963, 1966) is discussed in detail.  $E$  is the total energy  
of the neutral annihilation products, and  $p$  is the total momentum. A single  
 $\eta^0$ -meson among these products would cause a peak in  $dN/dM$  at  $M = m_{\eta^0}$ .  
Experimental data on two-, four-, and six-pronged stars were analyzed from  
this point of view but the theoretically predicted particularity of the  
threshold of  $\eta^0$ -meson production according to  $\pi^- + p \rightarrow \eta^0 + n$  could not be  
verified. There are 7 figures and 1 table.

Card 3/3

GOLDANSKI, V.I. [Gol'danski, V.I.]

Nuclear chemistry and prospects of its development. Analele  
chimie 17 no.2:3-12 Ap-Je '62.

S/903/62/000/000/026/044  
B102/B234

AUTHOR: Gol'danskiy, V. I.

TITLE: Biproton radioactivity

SOURCE: Yadernyye reaktsii pri malykh i srednikh energiyakh; trudy  
Vtoroy Vsesoyuznoy konferentsii, iyul' 1960 g. Ed. by  
A. S. Davydov and others. Moscow, Izd-vo AN SSSR, 1962, 352-365

TEXT: The author has already indicated (Nucl. Phys. 19, 482, 1960) that biproton radioactivity should be a general property of neutron-deficient light nuclei with even  $Z$  near the proton instability limits. It may not be observable as a special new phenomenon but only via correlation investigations (cf. also Cameron, AECL-CRP-690, 1957). Biproton radioactivity may arise with nuclei up to Sn ( $Z=50$ ) since heavier nuclei already show  $\alpha$ -instability. It is mainly energy correlation considerations and angular correlation that may be applied for identifying biproton radioactivity. Both are analyzed and discussed in great detail. For a great many isotopes

$E_{pp} = |B_{podd}| - B_{pev}$  and  $E_{evap}$  were calculated numerically. Also a complete

system of all nuclei that may be biproton-active is described giving the  
Card 1/2

Biproton radioactivity

S/903/62/000/000/026/044  
B102/B234

numbers of evaporated neutrons, the threshold energies and the Z numbers of the final nuclei. The formation of biproton-active nuclei in reactions participated by  $\text{He}^3$  or multiply-charged ions is analyzed and three-particle decays are discussed. There are 3 figures and 3 tables.

ASSOCIATION: Fizicheskii institut im. P. N. Lebedeva AN SSSR (Physics  
Institute imeni P. N. Lebedev AS USSR)

42706

S/020/62/147/002/016/021  
B101/B186

AUTHORS: Birkalov, I. M., Gol'danskiy, V. I., Corresponding Member  
AS USSR, Yankolopov, N. S., Terekhova, S. F., Trofimova, G.M.

TITLE: Peculiarities of solid-phase radiation polymerization during  
irradiation

PERIODICAL: Akademiya nauk SSSR. Doklady, v. 147, no. 2, 1962, 395-398

TEXT: To eliminate the aftereffects liable to falsify the results when the solid-phase irradiated monomer is analyzed after thawing, the radiation polymerization of acrylonitrile (AN) and of vinyl acetate (VA) was studied in an apparatus whereby thermal effects and e.p.r. signals during and after irradiation with 1.6-Mev electrons at  $-196$  to  $0^{\circ}\text{C}$  could be recorded simultaneously. Details of procedure and analysis will be published

separately (Vysokomolek. soed., now printing). Results: with AN, the polymerization was limited below  $-140^{\circ}\text{C}$  (4% polymer yield at  $-196^{\circ}\text{C}$ ). After repeated irradiation with 6 Mrad in each case, thawing and freezing the sample intermediately, the polymerization limit increased proportionally with the number of irradiations. At  $-196^{\circ}\text{C}$ , the molecular weight dropped

Card 1/3



Peculiarities of solid-phase...

U/C20/62/147/002/016/021  
8101/3166

with increasing dose ( $\gamma$ -10 Mrad) from  $\sim 1.5 \cdot 10^3$  to  $\sim 7 \cdot 10^4$ . After-polymerization occurred at  $-140^\circ$ ,  $-100^\circ$ , and  $-60^\circ\text{C}$ , but not at lower temperatures. At  $-60^\circ$ , the molecular weight then rose to  $\sim 10^5$  within 10 hr. The activation energy of afterpolymerization was equal to that for liquid-phase polymerization:  $\sim 3$  kcal/mole. The e.p.r. signals of AN remained unchanged during and after irradiation. The heat of fusion of AN samples irradiated at low temperatures remained constant within the errors of measurement:  $35 \pm 1$  cal/g. The polymerization of AN thus proceeds at  $-140^\circ$  completely in solid phase, whereas slight, slow aftereffects occur at  $-100^\circ$ . The polymerization of VA was not limited. The rate of polymerization of glassy VA was one order of magnitude higher than that of crystalline VA. The molecular weight of glassy VA (at  $-120^\circ\text{C}$ ) decreased with increasing dose from  $3 \cdot 10^4$  to  $7 \cdot 10^3$ . The molecular weight of crystalline VA was only a fraction of that of glassy VA. Afterpolymerization did not occur. When irradiated VA was thawed, the e.p.r. signal disappeared at  $-129^\circ\text{C}$ , the point of phase transition from glassy to crystalline state. The loss of heat in the phase transition ( $34 \pm 1$  cal/g) and the heat absorption ( $33 \pm 2$  cal/g) in melting were recorded thermogravimetrically. Thus, the polymerization of VA also occurred in

Card 2/3

S, '020/62/147, '002/016/021  
B101/B186

Regularities of solid-phase...

the solid phase. The following causes are assumed for solid-phase  
radiation polymerization: (a) formation of short-lived excited molecules;  
(b) scattering of substance along the tracks of primary particles and  
 $\alpha$ -electrons, which imparts properties to the substance similar to those  
that occur near phase transitions and near the melting point. There are  
4 figures.

ASSOCIATION: Institut Khimicheskoy fiziki Akademii nauk SSSR (Institute  
of Chemical Physics of the Academy of Sciences USSR)

SUBMITTED: August 3, 1962

1. The first part of the document is a letter from the Director of the Central Intelligence Agency to the President of the United States, dated September 26, 1962.

2. The second part of the document is a letter from the Director of the Central Intelligence Agency to the President of the United States, dated September 26, 1962.

3. The third part of the document is a letter from the Director of the Central Intelligence Agency to the President of the United States, dated September 26, 1962.

4. The fourth part of the document is a letter from the Director of the Central Intelligence Agency to the President of the United States, dated September 26, 1962.

5. The fifth part of the document is a letter from the Director of the Central Intelligence Agency to the President of the United States, dated September 26, 1962.

6. The sixth part of the document is a letter from the Director of the Central Intelligence Agency to the President of the United States, dated September 26, 1962.

7. The seventh part of the document is a letter from the Director of the Central Intelligence Agency to the President of the United States, dated September 26, 1962.

8. The eighth part of the document is a letter from the Director of the Central Intelligence Agency to the President of the United States, dated September 26, 1962.

9. The ninth part of the document is a letter from the Director of the Central Intelligence Agency to the President of the United States, dated September 26, 1962.

10. The tenth part of the document is a letter from the Director of the Central Intelligence Agency to the President of the United States, dated September 26, 1962.



5/544/82, 000/000, 077/129  
2425, 2/07

AUTHORS: Burkatov, I. A., Gol'danskiy, V. I., Dmitriyev, I. A. and  
Kochennin, S. S.

TITLE: Radiation polymerization of acetylene with electron

NUMBER: 1982-11 Vsesoyuznyy Soveshchaniye po radiatsionnoy khimii. 21. by N. S. Kochennin, no. 000, individual work, 1981, 40-42.

TEXT: The reaction kinetics and the mechanism of polymerization of phenyl acetylene, hexene and cyclohexylacetylene were studied. In both cases, the dissolved monomers, between +80 and -100°C, initiating the polymerization by  $\gamma$ -rays, electrons. For both polymerizations, the polymer increased proportionally to the dose of radiation, indicating the absence of inhibitors. Atmospheric oxygen increased the yield of the phenylacetylene polymer, but not those of hexene and cyclohexylacetylene, owing to the absence of the phenyl group in the latter 2 compounds. The rate of polymerization velocity (V) is directly proportional to the radiation intensity (I) and not to

Chem. 1/1

3 444, 000, 000, 077 121  
 0425/0001

# Radiation polymerization of ...

... of ... for ... monomers. ... of ... of ...  
 ... is the most important feature of these ...  
 ... of ... is relatively ...  
 ... in ...  
 ... of ...  
 ... is proposed, substituting ...  
 ... by a single process of chain 'extinction' or 'quenching', for  
 which mathematical formulas are presented. This theory accounts for  
 the low activation energy of radiation-induced polymerization of  
 acetylenic hydrocarbons, and also explains the ... of ...  
 inhibiting action by oxygen. Mention is also made of the possibility  
 of initiating the polymerization by peroxides. ...  
 and 1 table.

ASSOCIATION: Institut Khimicheskoy fiziki A.N. SSSR (Institute of  
 Chemical Physics, AS USSR)

3/344/000,000,104,124  
3444/000

The welding of teflon ...

... of the ... particles produced. The ...  
... of this method, in which the ...  
... containing ...  
... of ...  
... of the ...  
... respectively, the ...  
... were obtained: teflon with teflon, polyethylene,  
... 120 - 140 and 80 respec-  
... 120 - 140. There are 2 figures and 1 table.

ASSOCIATION: Institut khimicheskoy fiziki AN SSSR (Institute of  
Chemical Physics, AS USSR)

Card 1/1

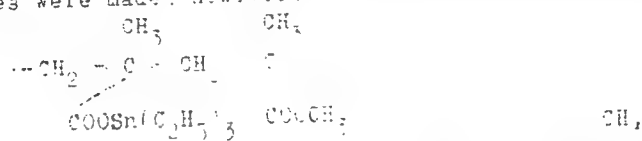
S/05c/62/04-1/02/051/055  
B/CB/8138

AUTHORS Bryukhanov V. A. Goldanskiy, V. I. Dolgikh N. N.  
Mazarov Ye. F. Shpinel' V. S.

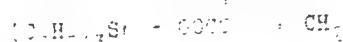
TITLE Mossbauer effect in polymers

PERIODICAL Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 42  
no. 2, 1961, 637-639

TEXT Mossbauer effect in polymers is very weak because polymers usually  
contain only light nuclei and have no distinct crystal structure.  
Successful studies were made, however, with the terphenyl compound



which is the copolymer



Card 1/3



S/056/62/042/002/051/055  
B108/3136


Mossbauer effect in tin-

ASSOCIATION

Institut khimicheskoy fiziki Akademii nauk SSSR (Institute  
of Chemical Physics of the Academy of Sciences USSR)  
Institut yadernoy fiziki Moskovskogo gosudarstvennogo  
universiteta (Institute of Nuclear Physics of Moscow State  
University)

SUBMITTED.

December 13, 1961



S/056/62/043/003/C14/063  
B102/B104

AUTHOR: Bel'man, V. I., Khrapov, V. V.

TITLE: Comparison of the effect of electron irradiation on the optical activity of racemates and optical antipodes

ORIGINAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 41, no. 2/4, 1961, 811-827

TEXT: The literature contains contradictory statements as to the effect of electrons (from  $\beta$ -decay or accelerated) on mirror isomers (antipodes). Therefore the authors studied carefully the electron irradiation effects on solid racemates and separated forms of optical isomers. 22 forms of 11 organic compounds (as  $C_{20}H_{22}N_2O_2$ ) were irradiated by 1)  $\beta$ -electrons from  $Rn^{104}$  (produced in an MPT-1000 (IRT-1000) reactor with a neutron flux of  $1 \cdot 10^{11}$  -  $1 \cdot 10^{12}$ ;  $Rn^{104}$  activity 20-200 curies,  $\beta$ -dose 150-15000 Mrad); 2) electrons accelerated at the electron of the IFP AN SSSR (0.5 MeV, 1-4  $\mu$ A, beam diameter 6 mm; dose 50-500 Mrad); 3) electrons accelerated in a cascade accelerator of the IKRF AN SSSR (1.5 MeV, 0.5-1  $\mu$ A, beam

[illegible][illegible]

Author's address: Institute Khimiya Kosmos, Leningradskaya Akademiya Nauk SSSR (L.A.N.S.S.S.R.)  
of Chemical Physics of the Academy of Sciences USSR

STARTED: April 12, 1961

4

12736

S/G2C/62/146/006/006/G16  
B104/B186

AUTH: Goldanskiy, V. I., Corresponding Member AS USSR  
TITLE: Emission of delayed protons in the positron decay of neutron  
deficient nuclei

PERIODICAL: Akademiya nauk SSSR. Doklady, v. 140, no. 6, 1962, 1309-1311

TEXT: It is investigated which isotopes are able to emit delayed protons  
after a  $\beta^+$  decay. Starting from the emission of delayed protons by  $^{17}_{10}\text{Ne}$

and  $^{20}_{12}\text{Mg}$  the condition  $Z_{N+1}^A - Z_{N+1}^{A-1} > \left[ 1.2 \frac{Z}{A^{1/3}} + 6.8 \right]$  Mev is obtained  
for the possibility of an emission of delayed protons,  $Z_{N+1}^A$  being the mass  
defect of the respective nucleus. From the atomic mass numbers for  
neutron-deficient nuclei as given in previous papers (V. I. Goldansky,  
Nuclear Phys. 19, 482 (1960) and A. G. Cameron, Report CRP-690 (1957)) it  
is deduced that the following isotopes of even elements can emit delayed

Card 1/3

Emission of delayed protons in...

3/020/62/146/006/006/016  
B104, B156

protons:  $\text{Ar}^{33}$ ,  $\text{Cl}^{37}$ , or  $\text{Cl}^{35}$ ,  $\text{Ti}^{48}$ ,  $\text{Cr}^{53}$ ,  $\text{Fe}^{47}$ ,  $\text{Ni}^{51}$ ,  $\text{Zn}^{57}$ ,  $\text{Ge}^{61}$ ,  $\text{Se}^{65}$ ,  $\text{Kr}^{69}$ ,  $\text{Sr}^{73}$ ,  $\text{Zr}^{77}$ ,  $\text{Mo}^{81}$ ,  $\text{Tc}^{85}$ ,  $\text{Ru}^{89}$ ,  $\text{Pd}^{93}$ ,  $\text{Cd}^{97}$  and  $\text{Sn}^{99}$ . From the half-period of the  $\beta^+$  decay it is estimated that the delay time lies between 0.1 sec (Ar) and 0.01 sec (Sn). Delayed protons may possibly be emitted in isolated cases ( $\text{Ar}^{33}$ ,  $\text{Se}^{65}$ ,  $\text{Fe}^{47}$ ,  $\text{Cd}^{97}$ ,  $\text{Sn}^{99}$ ) resulting from  $\beta^+$ -decays not only into an excited state but also into the ground state. In such a case proton-radioactive nuclei are produced. The examples of delayed protons emission ( $\text{Ti}^{41}$  and  $\text{Se}^{67}$ ) given by V. A. Kuznetsov and N. I. Tarantin proved to be inappropriate according to the above condition, because in the first of these cases an energy difference of zero and in the second case a negative energy difference are obtained, whereas the emission of delayed protons required not only a positive energy difference but also a difference exceeding the energy  $T_p$  of the proton emitted. It is stated in conclusion that the delayed protons observed by I. Preiss in experiments at Yale University did not, as assumed, result from a two-proton radioactivity of  $\text{N}^{16}$  which occurs in the reaction  $\text{Be}^9 + \text{C}^{12}$ , but from a  $\beta^+$ -decay of  $\text{Ne}^{17}$  on

Card 2/3

Emission of delayed protons in...

S/020/62/146/006/006/016  
B104/3186

excited  $F^{17}$  levels.

ASSOCIATION: Institut khimicheskoy fiziki Akademii nauk SSSR (Institute  
of Chemical Physics of the Academy of Sciences USSR)

SUBMITTED: July 21, 1962

Card 3/3

GOLDANSZKIJ, V.I. [Goldanskiy, V.I.] (Sovjetunio)

Nuclear chemistry and prospects of its development. Tekhnika 6  
no.9:2 S '62.

S/C64/62/001/012/001/006  
3119/3160

AUTHORS: Barkalov, I. M., Gol'danskiy, V. I.

TITLE: Radiation polymerization

PERIODICAL: Khimicheskaya promyshlennost', no. 12, 1962, 1 - 6

TEXT: The article reviews Western and Soviet research work carried out between 1959 and 1962 on polymerization by means of ionizing radiation. Particular attention is paid to the polymerization of hardly polymerizable monomers (fluorine compounds, oxides of tertiary monovinyl phosphines, etc.), polymerization by the ion mechanism, and polymerization in the solid phase. There are 57 references.

ASSOCIATION: Institut khimicheskoy fiziki AN SSSR (Institute of Chemical Physics AS USSR)



BARKALOV, I.M.; GOL'DANSKIY, V.I.

Recent developments in radiation polymerization. Khim.prom.  
no.12:859-864 D '62. (MIRA 16:2)

1. Institut khimicheskoy fiziki AN SSSR.  
(Polymerization)  
(Radiation)

APPROVED FOR RELEASE: Thursday, September 26, 2002 CIA-RDP86-00513R000515610017-3  
APPROVED FOR RELEASE: Thursday, September 26, 2002 CIA-RDP86-00513R000515610017-5

APLOV, A. V.; FERNBERG, I. N.; GOL'DANSKIY, V. I.

"Mossbauer spectra of iron compounds with terminal groups of amino, zinc and their interpretation."

report presented at 1st Int. Conf. Coordination Chemistry, Vienna, 1961, Sep. 1961.

GOLDANSKIY, Vitaliy Iosifovich; KRASNIKOV, V A., red.; SUSHKOVA,  
L.A., tekhn. red

[Mossbauer effect and its application in chemistry] Effekt  
Messbauera i ego primeneniia v khimii. Moskva, Izd-vo AN  
SSSR, 1963. 81 p. (MIRA 16:10)

.. Chlen-korrespondent AN SSSR (for Goldanskiy).  
(Mossbauer effect) (Chemistry, Physical and theoretical)

BARKALOV, I.M., GOLDANSKIY, V.I., AND HO MIN HAO

"Radiation polymerization of acetylene hydrocarbons: special features."

Report submitted to the Congerence on the Application of Large Radiation  
Sources in Industry Salzburg, Austria 27-31 May 1963

GOLDANSKIY, V. I.

"The Application of the Mossbauer Effect to Chemical Problems"  
Institute of Chemical Physics, USSR Academy of Sciences, Moscow, USSR.

19th International Congress on Pure and Applied Chemistry, London 10-17 Ju '63

4  
PARKALOV, I.M., GOLDANSKIY, V.I., TENIKOLOPYAN, N.S., TROFIMOVA, O.M.,  
TEREKHOVA, S.P.

Radiation-induced solid-state polymerization.  
Part I..Polymerization of acrylonitrile.

Part II..Polymerization of vinyl acetate.

Various kinds of polymerisation rate temperatures dependences.

Report submitted for the International Symposium of Macromolecular chemistry,  
Paris, 1-6 July 63

GOL'DANSKIY, V. I., KETAPOV, V. V., MAKAROV, E. P..

"Structural Studies of Tin-organic Carboxylates. Polymer Tin-organic Carboxylates and Related Compounds by the Membrane Method."

Report presented at the 1st Int. Conf. on the Membrane Method, 1963, New York, 4-7 Aug 63.



S/190/63/005/003/013/024  
B101/B186

AUTHORS: Barkalov, I. M., Berlin, A. A., Gol'danskiy, V. I., Kuo Min-kao

TITLE: Kinetics of phenylacetylene polymerization initiated with benzoyl peroxide

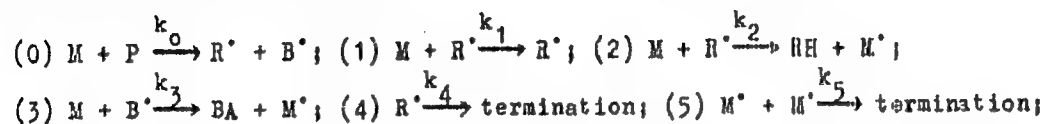
PERIODICAL: Vysokomolekulyarnyye soyedineniya, v. 5, no. 3, 1963, 368-372

TEXT: The decomposition of benzoyl peroxide (BP) in phenylacetylene (PA) was studied in the absence of oxygen at 60 - 80°C by iodometrically determining the remaining BP, by titrating the benzoic acid formed and by cryoscopically determining the molecular weight of the polymer formed. The concentration of the components dissolved in benzene was 1.72 - 9.11 mole/l PA, 0.0137 - 0.0840 mole/l BP. It has been found that the polymerization stops at a low degree of conversion, that the decomposition of BP in PA takes place more rapidly than in vinyl monomers, and that the reaction is of first order with respect both to PA and to BP. The maximum yield of poly-PA is directly proportional to the BP concentration where 6.8 mole PA are polymerized per mole BP. The molecular weight of the polymer was 730. The activation energy of polymerization is  $21 \pm 1$  kcal/mole. Hence the following reaction order is suggested for the polymerization process:

Card 1/2

S/190/63/005/003/013/024  
 B101/B186

Kinetics of phenylacetylene...



(6)  $R^\cdot + R^\cdot \xrightarrow{k_6} \text{termination}$ . M is the monomer, P is benzoyl peroxide,  $R^\cdot$  is the polymer radical,  $B^\cdot$  the benzoyl radical, BA benzoic acid. Since  $[R^\cdot] \ll [M]$  reaction (6) and reaction (4) can be neglected.  $\bar{n} = (3 + k_1/k_2)k_0[M][P]$

holds for the reaction rate,  $v = 3 + k_1/k_2$  for the chain length, from which it follows that at  $v \approx 7$ ,  $k_1/k_2 = 4$ . Conclusion: In the radiation polymerization studied earlier (Vysokomolek. soved., 2, 1103, 1960) as well as in the peroxide-initiated polymerization the same mechanisms are active, which is obviously a characteristic feature of the polymerization of acetylene hydrocarbons. There are 5 figures and 2 tables.

ASSOCIATION: Institut khimicheskoy fiziki AN SSSR (Institute of Chemical Physics AS USSR)

SUBMITTED: August 18, 1961

Card 2/2

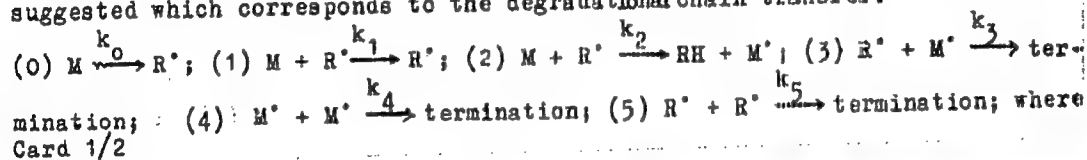
S/190/63/005/003/014/024  
B101/B203

AUTHORS: Barkalov, I. M., Gol'danskiy, V. I., Kotova, L. M.,  
Kuz'mina, S. S.

TITLE: Radiation polymerization of acetylene derivatives

PERIODICAL: Vysokomolekulyarnyye soyedineniya, v. 5, no. 3, 1963, 373-377

TEXT: The radiation polymerization of hexyne-1, cyclohexyl acetylene, and octyne-1 up to 10-12% degree of conversion was studied by a method described earlier (Vysokomolek. soyed., 2, 1103, 1960). The results were compared with those obtained for phenyl acetylene. The rate of polymerization decreases in the order phenyl acetylene > octyne > hexyne, cyclohexyl acetylene, and is proportional to the first degree of irradiation intensity. The polymer yield between -196 and 0°C is independent of the radiation dose. Admission of oxygen does not inhibit the process. A reaction sequence is suggested which corresponds to the degradational chain transfer:



Card 1/2

Radiation polymerization of...

S/190/63/005/003/014/024  
B101/B203

$R^{\bullet}$  = polymer radical;  $M^{\bullet}$  radical type  $R-C\equiv C^{\bullet}$ ;  $M$  = monomer. Since  $[R^{\bullet}] \ll [M^{\bullet}]$ , reaction (5) can be neglected. If termination occurs according to (3),  $W = (2 + k_1/k_2)k_0 I[M]$  holds for the reaction rate, and  $\nu = 2 + k_1/k_2$  for the chain length. If termination occurs according to (4),  $W = (3 + 2k_1/k_2)k_0 I[M]$  and  $\nu = 3 + 2k_1/k_2$ . The latter equation corresponds better to the experimental length  $\nu = 10 - 13$ .  $k_1/k_2$  does not depend on the nature of the radical. The free valence of the polymer chain is situated on a link of the structure  $-CR-CR^{\bullet}$ . Owing to intense self-inhibition by the monomer, the inhibiting effect of  $O_2$  is not efficient. On the contrary, the yield increases in octyne-1 and phenyl acetylene in the presence of oxygen due to the formation of the more active peroxide radicals. There are 1 figure and 1 table.

ASSOCIATION: Institut khimicheskoy fiziki AN SSSR (Institute of Chemical Physics AS USSR)

SUBMITTED: August 18, 1961

Card 2/2

GOL'DANSKIY, V.; YEGOROV, Ye., nauchnyy sotrudnik

Neutrons weld and crosslink polymers. Tekh.mol. 31 no.2:30-31  
'63. (MIRA 16:6)

1. Chlen-korrespondent AN SSSR (for Gol'danskiy). 2. Laboratoriya  
yadernoy i radiatsionnoy khimii Instituta khimicheskoy fiziki  
AN SSSR (for Yegorov).

(Neutrons)

L 13829-83 EWP(J)/EPR(S)/ENT(I)/EWP(Q)/ENT(M)/BDS APFIC/ASD Po-4/

Pr-4 RM/WW/JD

ACCESSION NR: AP3003557

S/0020/63/151/002/0357/0360

75  
74

AUTHOR: Gol'danskiy, V. I. (Corr. member, AN SSSR); Makarov, Ye. P.; Stukan, R. A.; Trukhtanov, V. A.; Khrapov, V. V.

TITLE: Analysis of the structure of polymeric organo-tin oxides  $R_2SnO$  by Mossbauer effect

SOURCE: AN SSSR. Doklady\*, v. 151, no. 2, 1963, 357-360

TOPIC TAGS: Sn, Mossbauer effect

ABSTRACT: New assumptions are proposed on the structure of  $R_2SnO$  organo-tin molecules, based on the presentation of the results of the Mossbauer effect, investigations in these oxides and related compounds. The Mossbauer spectra for all these compounds consist of two lines. Also the probability of the Mossbauer effect for some  $R_2SnO$  organo-tin oxides is investigated. "In conclusion, the authors express their sincere gratitude to Ye. M. Panov, O. A. Ptitsy\*na, and N. I. Sheverdina for submitting preparations of tin-organic compounds." Orig. art. has: 2 figures, 5 formulas, and 1 table.

Card 1/2/

*Inst. of Chemical Physics, Academy of Sciences*

Page 1/3

2. *Interpretation of the results of the study*

crystal of cast polypropylene crystal. The different angles of  
rotation of the specimen with respect to the direction of the beam of  
X-rays will give different information of the internal structure in lamellar  
regions. For example, there is a lamellar crystal along the x-axis  
of the crystal at 70°K with an HRF in such instrument with a SAG,

isotropic specimens were prepared as layers of finely ground polymer on aluminum substrate. Other anisotropic specimens were prepared by melting and subsequent slow cooling on an aluminum substrate, in order to obtain coarsely spherulitic lamellae, preferentially oriented along the substrate. The isotropic as well as the anisotropic specimens were studied at angles of  $90^\circ$  and  $45^\circ$ , respectively, with respect to the beam of  $\gamma$  rays. With the isotropic specimen, the Raman spectrum was the same for both angles. At  $90^\circ$ , the shape of the spectrum of the anisotropic specimen is different from that of the isotropic specimen. This excluded the possibility of an explanation of the difference of the two peaks by the assumption that singlet lines of two different chemical compounds are superimposed. If the anisotropic specimen is turned to  $45^\circ$ , there is again a change in the spectrum. The experimental results

Card 2/3



The difference of the two peaks in ...

5/216/13/001/002/054/065  
3/13/2/136

are considered to give evidence for the view stated above. There is 1 figure.

ASSOCIATION: Institut Khimicheskoy Fiziki Akad. Nauk SSSR, Institute of Chemical Physics of the Academy of Sciences [USSR]

SUBMITTED: November 12, 1962

Doc 1 3/5

L 14352-63 EMT(m)/BDS AFPTC/ASD/ESD-3 RM

ACCESSION NR: AP3003857

S/0020/63/151/003/0608/0611

AUTHORS: Gol'danskiy, V. I. (Corr. mem. AS, SSSR), Solonenko,  
T. A.; Shantarovich, V. P.

TITLE: Moderation and inhibition of positronium formation in  
aqueous and organic solvents.

SOURCE: AN SSSR. Doklady\*, v. 151, no. 3, 1963, 608-611

TOPIC TAGS: positronium, positron, organic solvent, aqueous  
solvent

ABSTRACT: R. E. Ball et al (Phys. Rev. 90, 1953, 644) have shown  
that duration of life of a positron in liquid or solid phase  
depends on formation of two kinds of complexes, called para or  
ortho positronium. Since the annihilation of the positron and  
formation of positronium is an interrelated occurrence, the  
moderation or inhibition of positronium formation has a direct  
connection with the duration of life of the positron. The

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moderation of positronium can be explained by: (a) conversion of ortho into para positronium; (b) annihilation of positron in ortho-positronium; (c) oxidation-reduction reaction liberating the positron; (d) addition of ortho-positronium to the unsaturated molecule. Since the potential of ionization of positronium is 6.8 ev, the effective formation of positronium takes place in an energy interval  $E_{Te^+} > 6.8$  ev. By introducing into the solution the additions for which the first level of excitation is lower than for the molecule of solvent, the inhibition of positronium can be achieved. In the present work, the effect of additions of  $NO_3^-$ ,  $CrO_4^{2-}$ ,  $Cr_2O_7^{2-}$  and  $MnO_4^-$  to aqueous solutions and  $C_6H_6$  to  $C_6H_5J$  has been investigated, using the equipment similar to that used by R. G. Green et al (Nucl. Instrum. 3, 1958, 127). Experiments with aqueous solutions have shown that  $CrO_4^{2-}$ ,  $Cr_2O_7^{2-}$  and  $MnO_4^-$  are moderators and  $NO_3^-$  is an inhibitor.  $C_6H_5J$  also turned out to be an inhibitor. A further experimental proof about the correctness of Ore's postulation is desirable, since it can be used to evaluate the energy of first level excitation of large amount of molecules. Orig. art. has: 3 figures.

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*List of Chemical Physics*

GOL'DANSKIY, V.I.

Some problems of nuclear chemistry. Nauka i zhizn' 30 no.3:16-18  
Mr '63. (MIRA 16:5)

1. Zaveduyushchiy laboratoriyey yadernoy i radiatsionnoy khimii  
Instituta khimicheskoy fiziki AN SSSR. Chlen-korrespondent AN SSSR.  
(Chemistry, Physical and theoretical--Problems, exercises, etc.)  
(Nuclear physics--Problems, exercises, etc.)

BARKALOV, I.M.; GOL'DANSKIY, V.I.; GO MIN'-GAO [Kuo Min-kao]

Kinetics of benzoyl peroxide decomposition in acetylenic hydrocarbons. Dokl. AN SSSR 151 no.5:1123-1126 Ag '63. (MIRA 16:3)

1. Institut khimicheskoy fiziki AN SSSR. 2. Chlen-korrespondent AN SSSR (for Gol'danskiy).  
(Benzoyl peroxide) (Hydrocarbons)

ABLOV, A.V., akademik; BELOZERSKIY, G.Y.; GOL'DANSKIY, V.I.; MAKAROV, Ye.F.;  
TRUKHTANOV, V.A.; KHRALOV, V.V.

Mössbauer's spectra of complex compounds of iron with  
diacetylthiosemicarbazone oxime. Dokl. AN SSSR 151 no.6:1352-1355  
Ag '63. (MIRA 16:10)

1. Institut khimicheskoy fiziki AN SSSR i Institut khimii AN  
Moldavskoy SSR. 2. AN Moldavskoy SSR (for Ablov). 3. Chlen-  
korrespondent AN SSSR (for Gol'danskiy).

ABLOV, A.V., akademik; BERSUKER, I.B.; GOL'DANSKIY, V.I.

Interpretation of the resonance absorption of  $\gamma$ -quanta by  
some complex iron compounds with allowance for the covalence  
of bonds and induction effects. Dokl. AN SSSR 152 no.6:  
1391-1394 O '63. (MIRA 16:11)

1. Institut khimii AN Moldavskoy SSR i Institut khimicheskoy  
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GOL'DANSKIY, V.I.

Conference on Reactions between Complex Nuclei, held in the  
United States. Vest. AN SSSR 33 no.9:65-68 S '63. (MIRA 16:9)

1. Chlen-korrespondent AN SSSR.  
(Nuclear reactions) (Physics--Congresses)



1 8873-65 BWT(m)/EPT(c)/EPT(n)-2/EWP(j)/T Pc-h/Pr-h/Pa-h RFL AB(wp)-2/  
ASD(m)-3/ESD(t)/BSD/AFETR GG/RM

ACCESSION NR: AP4009152

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AUTHORS: Barkalov, I. M.; Gol'danskiy, V. I.; Ienikolopyan, M. S.; Tarakhova, S.  
F.; Trofimova, G. M.

TITLE: Radiation polymerization in solid phase. 1. Polymerization of acrylonitrile

SOURCE: Vysokomolekulyarnyye soyedineniya, v. 6, no. 1, 1964, 92-97

TOPIC TAGS: kinetics, acrylonitrile, polymerization, fast electron, irradiation, diathermal calorimeter, solid phase, energy chain

ABSTRACT: The radiation polymerization in the solid phase of monomers was investigated along with the temperature dependence of the initial polymerization rate, post-polymerization kinetics, and heat absorption rates. The study centered around the kinetics of acrylonitrile (AN) polymerization induced by fast electrons with an energy of 1.6 Mev obtained in an electron accelerator at the Institute of Chemical Physics AN SSSR. The specimen was placed in a special vessel under vacuum and its temperature controlled to within 2C during irradiation. The radiation dose varied from 0.2 to 10 Mrad/min. To determine when effective polymerization reactions occurred, a diathermal calorimeter was also used. The calorimetric determination showed that solid phase polymerization of AN occurs directly in the solid phase and not in the course of the following thawing process. There is practically no

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activation energy of the solid phase polymerization. From -196 to -150C a yield limit is observed at large doses, and there is no noticeable post-effect. Post-polymerization takes place from -140° up to the melting point, the activation energy of this process being 3 kcal/mole. It is presumed that the specific features of solid phase polymerization in the course of irradiation may be due to the effective participation of short-lived excited states in the propagation of the energy chains or due to a change in state of the solid during irradiation. "The authors express their sincere appreciation for the great interest and attention with which N. N. Semenov has followed the work, / as well as / their thanks to V. N. Shamshev / for assisting in / the measurements." Orig. art. has: 4 figures.

ASSOCIATION: Institut khimicheskoy fiziki AN SSSR (Institute of Chemical Physics AN SSSR)

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SUB CODE: CC, NP

NO REF SOV: 011

OTHER: 011

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AS(mp)-2/AFETR/RAEM(t)/ESD(gs)/BSD/ASD(m)-3 WH/GJ/RM

ACCESSION NR: APL009153

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AUTHORS: Barkalov, I. M.; Gol'danskiy, V. I.; Yenikolopyan, N. S.; Tarakhova, S. F.; Trofimova, G. M.

TITLE: Radiation polymerization in solid phase 2. Polymerization of vinyl acetate. Temperature variation dependence of polymerization rate

SOURCE: Vy\*sokomolekulyarny\*ye soyedineniya, v. 6, no. 1, 1964, 98-102

TOPIC TAGS: kinetics, polymerization, vinyl acetate, solid state, irradiation

ABSTRACT: The kinetics of the polymerization of vinyl acetate (VA) induced by 1.6-Mev electrons in the electron accelerator of the Institute of Chemical Physics (AN SSSR) was investigated for the liquid, crystalline, and glassy states in the course of studies which were undertaken with the purpose to clarify the problems of the radiation polymerization of monomers in the solid phase; in particular, the temperature dependence (0 to -196C) of the initial rate of polymerization was investigated in connection with an attempt to establish the radical or ionic type of the mechanism of polymerization. Polymerization in the solid state occurs with practically no temperature dependence, and the absolute rate values are about an order of magnitude higher for glassy VA than for the crystalline product. There is no post-polymerization at any of the temperatures investigated, and direct calori-

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metric measurements have shown that polymerization of VA in the solid phase occurs only in the process of irradiation; by no means is the process purely radical, as the process of polymerization in the liquid phase is. The temperature dependence of the rate of radiation polymerization in both solid and liquid phases has also been investigated in the case of methyl methacrylate (MMA), formaldehyde (FAL), phenylacetylene (PAC), and isobutylene (IB). Two basic types of such dependence have been established: 1)  $E > 0$  for the liquid and  $E \approx 0$  for the solid phases (VA, MMA, FAL, and acrylonitrile); and 2)  $E < 0$  for the liquid and  $E > 0$  for the solid phases, with maximum rate at the melting point (IB and other monomers, which polymerize by an ionic mechanism). The specific features of the rapid solid phase polymerization in the course of irradiation may be due either to the effective participation of short-lived, excited states in the propagation of the energy chains or to the change in state of the solid during the course of the irradiation. Orig. art. has: 4 figures.

ASSOCIATION: Institut khimicheskoy fiziki AN SSSR (Institute of Chemical Physics, AN SSSR).

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